THEORETICAL PHYSICS SEMINAR

Title: Critical Mass of Neutron Stars: A Black Hole Entropic View

Speaker: Prof. Parthasarathi Majumdar, Ramakrishna Mission Vivekananda University, Belur

Date/Time/Venue: 20th Febuary (Friday)/2:30PM/ Room No. 469

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Note the time of the seminar

ABSTRACT

We begin with a brief summary of extant approaches to understand the observed absence of neutron stars heavier than 2 solar masses. Many of these involve an adaptation of Chandrasekhar?s ideas of a limiting mass for white dwarf stars, based on hydrostatic equilibrium, to situations where general relativity can no longer be ignored. We survey the complications that this might introduce to the already difficult problem of determining the equation of state of this superdense system as an essential part of hydrostatic equilibrium. We then describe an alternative perspective, still under construction, to this problem, based on certain results from the analysis of (quantum) black hole entropy and thermal stability. These results, derived from a non-perturbative, background-independent formulation of canonical quantum gravity, will be discussed in some detail. Some attempts to incorporate entanglement entropy ideas into the construction are also to be discussed. The aim here is a formulation of the issue of neutron star instability in terms of the stability and growth of a nascent quantum horizon deep inside a collapsing neutron star. If this perspective works, this might be a first indirect evidence of quantum gravity playing an important role in the gravitational collapse of neutron stars.

All are welcome to attend